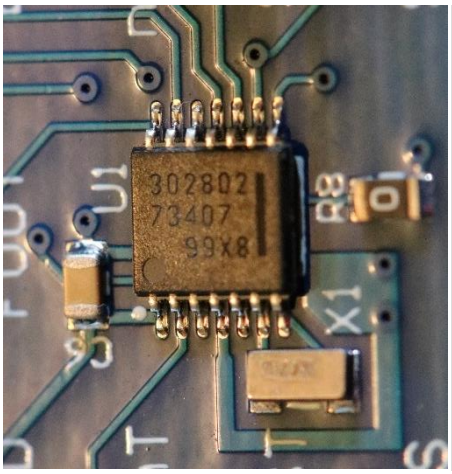
Innovation proposal

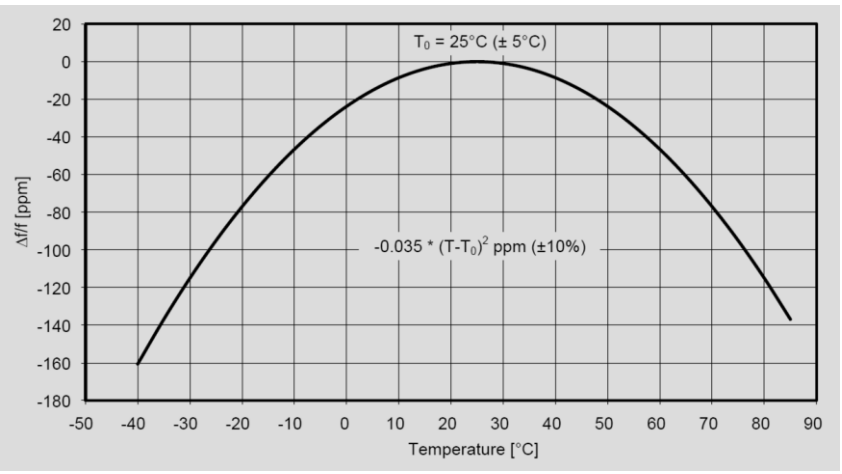
EM3028 RTC extends battery life of connected devices by 50%

The EM3028 Extreme low power Real-Time Clock (RTC), setting a new industry benchmark for accuracy and power consumption. The EM3028 leads the way for green IoT applications, with 50% extended battery life compared to its closest competitor, at double the accuracy. It can extend the device life span at a reduced overall BOM cost.

This RTC provides an elegant solution for increasing the autonomy of battery driven devices, by providing accurate sleep and wake-up timing for power-hungry elements in a certain application. The high accuracy and long-term stability of the EM3028 guarantee consistent performance throughout the device lifetime without the need to calibrate during manufacturing. Its 1-ppm accuracy guarantees a staggering 30 seconds precision over one year, twice as good as the best-in-class RTC previously on the market, while consuming lowest energy.

With only 40nA current consumption for 1-ppm accuracy, the EM3028 of EM Microelectronic Marin, occupies a top position in terms of low power consumption. The extreme low power consumption allows using low cost MLCC capacitors to cover the back-up time. Other key features of EM3028 include a 32-bit UNIX timer, operating voltage range as low as 1.2V, as well as a plug-and-play, factory pre-calibrated non-volatile configuration setting guaranteeing the configuration and user parameters are never lost, even in case of system power fail.





For safety against inadvertent overwriting of the time, a user programmable Password can protect registers and configuration registers.

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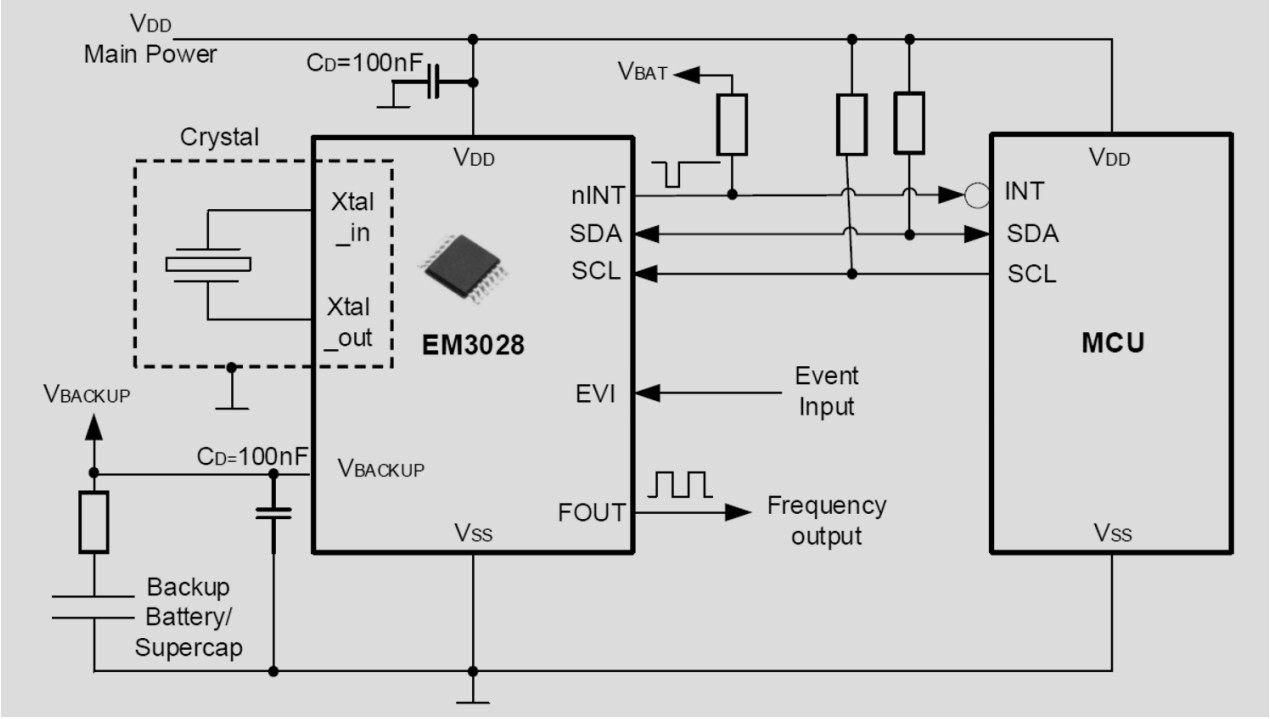
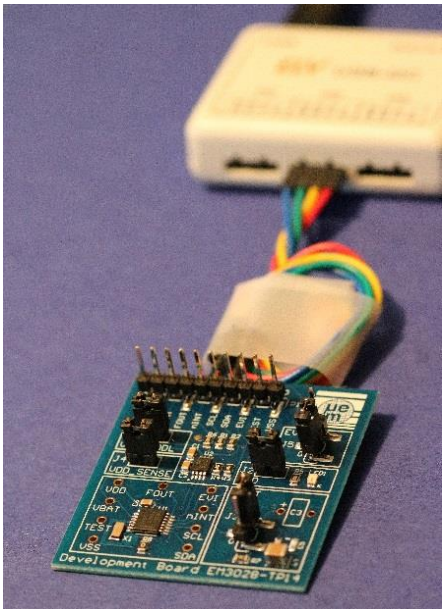
Technical Feature

- Extreme low power consumption: **40 nA @ 3 V**.
- Wide operating voltage range: **1.2 V to 5.5 V**.
- Time accuracy: possible to calibrate to **±1 ppm @ 25°C**
- Non-volatile configuration settings with user programmable offset value.
- Configuration stored in EEPROM and mirrored in RAM (for personalization and for storage of critical parameters)
- Password protection to secure configuration parameters
- Backup Switch and Trickle Charger function.
- Provides year, month, date, weekday, hours, minutes and seconds.
- Automatic leap year correction; 2000 to 2099
- 32 bit UNIX time counter.
- Timer, alarm and external event functions with time stamp
- Clock output: 32.768 kHz, 8192 Hz, 1024 Hz, 64 Hz, 32 Hz, 1 Hz.
- 43 bytes non-volatile user memory, 2 bytes user RAM.
- I^2C-bus interface: 400 kHz.
- Package: TSSOP14, 100% Pb-free, RoHS-compliant (On request also available in ultra-small SMD C7 package, factory calibrated and including the 32kHz fork crystal)

Typical application example:



Software Platform and support



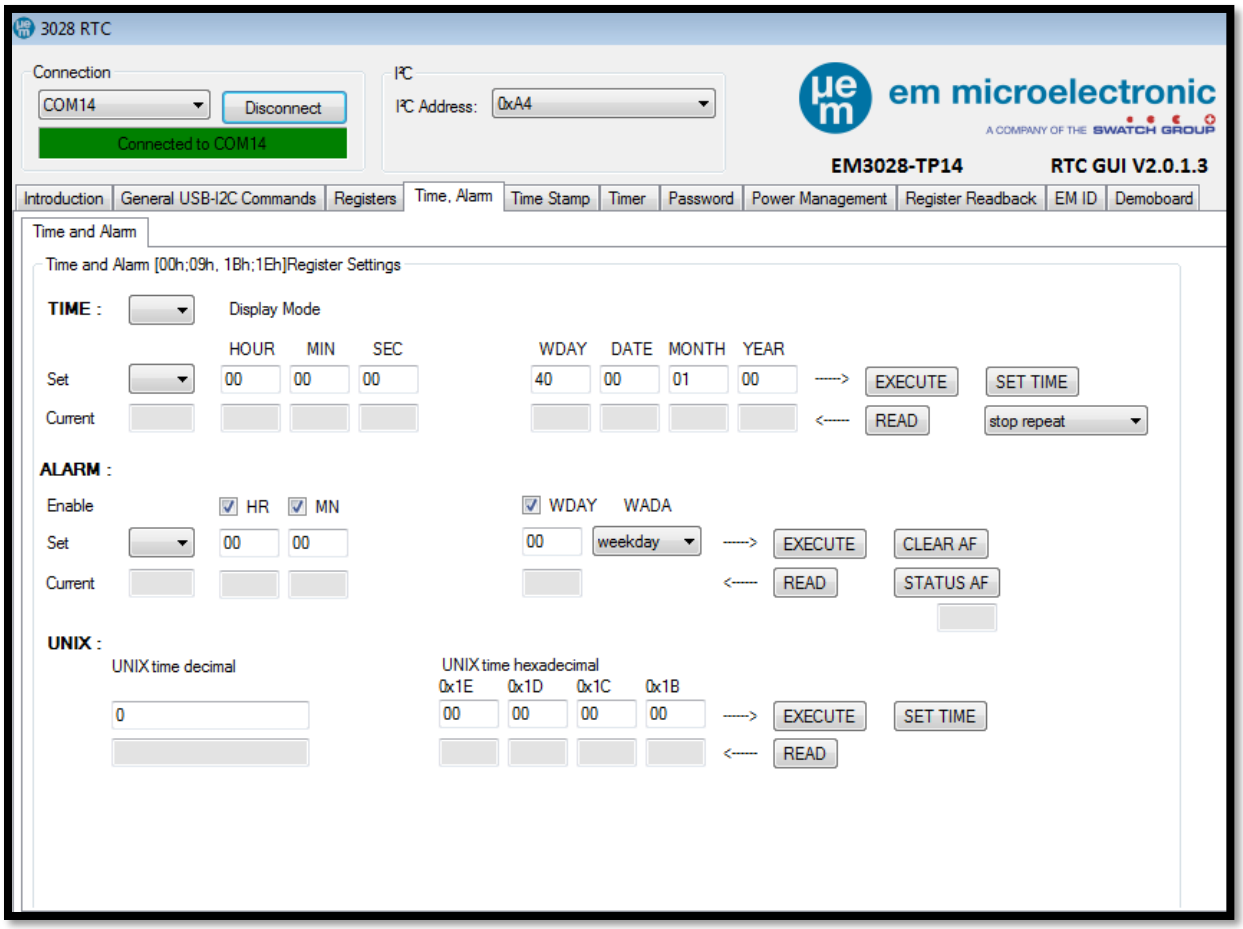
For evaluation purposes, EM Microelectronic provides an easy to use development board with GUI on PC, giving the user access to all registers of the IC. The development board is aimed to be used either directly connected to the target MCU or via the USB-I²C adapter (i.e. USB-I2C_kit from ELV).

The EM3028-TP14 is soldered on the Development Board, every pin of RTC is accessible at SMD-10 pol connector, and at the test-points are situated around the device.

There are two different types of development boards; one comes with the TSSOP14 RTC equipped and another contains the C7 SMD package with integrated quartz crystal.

In addition to the HW, we deliver an easy to learn GUI operating system that allows a quick evaluation of the EM3028.

Easy to use GUI - graphical user interface:



Further information and availability

Volume production:	started
Average lead-time:	approx. 8 weeks for volumes. Lower quantities ex stock Switzerland
Delivery:	On Tape & Reel; 2'500 units of TSSOP14 per reel
Samples:	Free of charge and available on request (ex stock)
Data-material:	Detailed data-sheet under www.emmicroelectronic.com/product/real-time-clocks-ic/em3028
Contact at EM:	info@emmicroelectronic.com Phone: +41-32-755 5111

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